No. 14-1146

In The
Supreme Court of the United States

TYSON FOODS, INC.,

Petitioner,

v.

PEG BOUAPHAKEO, et al., Individually and on Behalf of All Other Similarly Situated Individuals,

Respondents.

On Writ Of Certiorari To The United States Court Of Appeals For The Eighth Circuit

BRIEF OF ECONOMISTS AND OTHER SOCIAL SCIENTISTS AS AMICI CURIAE IN SUPPORT OF RESPONDENTS

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INTEREST OF AMICI CURIAE[1]

Amici are economists (including a Nobel laureate) and social scientists with extensive experience in using statistical and other empirical methods in academic, professional, regulatory and litigation settings.[2] As such, we have a substantial interest in ensuring that the Court's treatment of these issues comports with accepted economic and scientific principles. Petitioner Tyson Foods, Inc. ("Tyson") and various amici in support of Petitioner have advanced arguments that suggest that the use of "average" or statistical evidence is unreliable as a matter of law. These arguments, if accepted, would have far-reaching and in our view negative consequences in litigation. We respectfully submit this brief to emphasize the extent to which modern empirical methods – including statistics – are entirely reliable and in many cases valuable in class actions and other complex litigation settings. We firmly believe that statistics can help courts (and juries) make better decisions than they could in the absence of data.

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[1] The parties have lodged blanket consents to the filing of amicus briefs with the Clerk. No counsel for a party has authored this brief in whole or in part, and no such counsel or party made a monetary contribution intended to fund the preparation or submission of this brief. No person or entity other than amici curiae has made a monetary contribution to its preparation or submission.

[2] A list of amici is set forth in Appendix 1.

INTRODUCTION AND SUMMARY OF ARGUMENT

Rigorous empirical analysis – including the use of "average," "sampled," and statistical data – is a staple of economics and many other scientific disciplines. Average industry data can be highly revealing, for example, about overall market trends concerning supply, demand, price, and many other factors that might be relevant to a particular study or litigation matter. Economists and other professionals use such data all the time for all manner of inquiries, including, *inter alia*, investigations of market fraud, cartel conduct and effects, other civil and criminal market manipulation schemes, and much more.

So, too, with statistics. Multiple regression analysis, for example, is a bedrock tool of science and economics, and regression analysis by definition uses "average" data analysis to reveal broader industry and market trends. Econometric models employing regression techniques have been used in peer-reviewed articles published in major economics journals to study a wide variety of economic questions, including: the price effects of the 19th century railroad cartel,[3] the end of the reserve clause in baseball,[4] the price effects of mergers in the beer

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[3] Robert H. Porter, *A Study of Cartel Stability: The Joint Executive Committee, 1880-1886*, Bell Journal of Economics, Autumn 1983, at 301-314.

[4] Gerald W. Scully, *Pay and Performance in Major League Baseball*, American Economic Review, Dec. 1974, at 915-930.

industry,[5] the likely effects of the proposed merger between Staples and Office Depot,[6] the demand for automobiles,[7] the analysis of competition in retail food markets,[8] estimating the change in consumer welfare from the introduction of minivans,[9] and empirical studies of auctions that examine the effect of auction rules on winning bids.[10]

It is also beyond question that multiple regression analysis is used routinely and reliably in many

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[5] Jonathan B. Baker & Timothy F. Bresnahan, *The Gains from Merger or Collusion in Product-Differentiated Industries*, Journal of Industrial Economics, A Symposium on Oligopoly, Competition and Welfare, June 1985, at 427-444.

[6] Orley Ashenfelter, et al., *Empirical Methods in Merger Analysis: Econometric Analysis of Pricing in FTC v. Staples*, International Journal of the Economics of Business, July 2006, at 265-279.

[7] Berry S. Levinsohn, Jr. & Ariel Pakes, *Automobile Prices in Market Equilibrium*, Econometrica, June 1995, at 841-890.

[8] Aviv Nevo, *Measuring Market Power in the Ready-to-Eat Cereal Industry*, Econometrica, March 2001, at 307-342.

[9] Amil Petrin, *Quantifying the Benefits of New Products: The Case of the Minivan*, Journal of Political Economy, Aug. 2002, at 705-729.

[10] Ali Hortacsu & David McAdams, *Mechanism Choice and Strategic Bidding in Divisible Good Auctions: An Empirical Analysis of the Turkish Treasury Auction Market*, Journal of Political Economy, Oct. 2010, at 833-865. *See also*, Alvin E. Roth & Axel Ockenfels, *Last-Minute Bidding and the Rules for Ending Second-Price Auctions: Evidence from eBay and Amazon Auctions on the Internet*, American Economic Review, Sept. 2002, at 1093-1103.

litigation settings, including class actions.[11] To cast doubt on these methods as a general proposition, as Tyson invites the Court to do, is to misapprehend the

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[11] For example, as stated in the ABA SECTION OF ANTITRUST LAW, ECONOMETRICS (2d ed. 2014) at xiii, "Econometrics plays a central role in modern antitrust litigation and merger analysis, and economic experts are regularly the star witnesses in court and before the enforcement agencies." Similarly, the Federal Judicial Center's Reference Manual on Scientific Evidence states: "Over the past several decades the use of regression analysis in court has grown widely. Although multiple regression analysis has been used most frequently in cases of sex and race discrimination and antitrust violation, other applications have ranged across a variety of cases, including those involving census undercounts, voting rights, the study of the deterrent effect of the death penalty, and intellectual property." *See* David Rubinfeld, *"Reference Guide on Multiple Regression," in* FED. JUDICIAL CTR., REFERENCE MANUAL ON SCIENTIFIC EVIDENCE 419, 420 (3d ed., 2011) (footnotes omitted); *Bazemore v. Friday*, 478 U.S. 385, 398-401 (1986) (per curiam) (Brennan, J., joined by all members of the Court, concurring in part) (statistical analysis of "average black employee" data in discrimination case supports inference of individual injury). *See also In re Neurontin Marketing and Sales Practices Litig.*, 712 F.3d 21, 42 (1st Cir. 2013) ("regression analysis is a well recognized and scientifically valid approach . . and courts have long permitted parties to use statistical data to establish causal relationships" in class actions and many other settings) (collecting cases); *In re High Fructose Corn Syrup Antitrust Litig.*, 295 F.3d 651, 660-61 (7th Cir. 2002) (permitting use of regression analysis to show causation in antitrust case); *Chin v. Port Authority of New York and New Jersey*, 685 F.3d 135, 152-53 (2d Cir. 2012) (statistical evidence is highly relevant in discrimination cases); *Perez v. Mountaire Farms, Inc.*, 650 F.3d 350, 372 (4th Cir. 2011) (approving average time study as "a more accurate representation" of donning and doffing times in FLSA case).

world of economics and science in a troubling and extraordinary way.

None of this is to say, of course, that all average or statistical data is sound and reliable. Just as Tyson and certain amici go much too far in suggesting a categorical problem with such data, no self-respecting economist would assert that average or other statistical evidence is always used in a responsible way. Sometimes it is not. Appropriately used, however, statistics has its place in civil litigation, and in particular class action litigation under Rule 23 of the Federal Rules of Civil Procedure. Nothing in the Federal Rules of Evidence nor in the Rule 23 criteria disqualifies statistical evidence from being among the kinds of information judges may rely upon in their decision to grant or deny class status, or, for that matter, in any other phase of class action litigation. To the contrary, statistics can help courts make better decisions than they could without it. To adopt a sweeping rule of law that would remove potentially valuable information from judicial decision making is neither warranted, desirable, nor necessary to resolving this case. The Court should be mindful not only of the broad consequences of any direct holdings on these issues, but the potential unintended consequences of any language in the Court's opinion that could impact the use of "average" or "statistical" proof as a general matter of law.

The correct approach to these issues does not lend itself to hard and fast rules but rather to case-specific analysis. Some studies are valid and reliable.

Others are not. Either way, the expert's particular methods are the relevant question. And there can be no substitute, in law, economics or science, for doing the fact-bound work necessary to evaluate whether a given study is reasonable in context. That inquiry cannot be reduced, as Tyson would have it, to broad attacks on "average," "statistical," and other representative evidence in class actions or any other setting. The Court should avoid reaching any such holding, the unintended consequences of which would be serious in a wide range of federal cases.

ARGUMENT

I. STATISTICS IS A VALUABLE TOOL, WIDELY AND RELIABLY USED IN ECONOMICS AND SCIENCE.

Life is full of uncertainty, in the face of which individuals, businesses and policymakers must make a host of important choices. In this world of imperfect information, we could make guesses – even informed guesses – to determine what investments to make, what policies to follow, or what treatment to prescribe to a sick patient. What statistics offers is a scientific alternative to guesswork. As the American Statistical Association defines it: "Statistics is the science of learning from data, and of measuring, controlling, and communicating uncertainty."

Applied properly, statistics enables us to base decisions to the fullest extent possible on the available

information, or data. Statistics also allows us to quantify the degree of confidence we have in the data-based evidence on which our decisions are based. Guesswork does not. We prefer the scientific approach to the alternative.

Statistical methods can be divided into two broad classes: those that are descriptive, and those that are inferential. Descriptive statistics consists of mathematical methods designed to characterize certain aspects of a given set of data. Information relevant to a decision is often numerous and complex, and descriptive statistics lets us reduce this complexity so that it becomes accessible to the human mind. An important descriptive tool – and one that is the source of some contention in the present case – is averaging. Consider the way in which economists study fundamental questions of supply, demand, and price in a given industry or market. As a matter of course, we use average data, reflecting the possibly millions of transactions in that market, to understand and test the relevant trends and relationships. Far from being suspect, as Tyson seems to suggest, average data can be a highly useful and reliable tool in economics and many other disciplines.

Inferential statistics, on the other hand, comprises methods that allow us to use what is known to make estimates and predictions about the unknown. All inferential techniques in statistics are, in one way or another, based on the well-accepted concepts of sampling and extrapolation. Sampling refers to the idea that observed information is an incomplete,

grainy snapshot – a sample – taken from a larger universe of potentially observable information, called the population. Extrapolation means that this sample, although incomplete, can still be reliably informative about the population from which it is obtained. A medical treatment that is approved for general use only after it has been shown to be sufficiently safe and effective in a clinical trial is a classic example of decision making based on sampling and extrapolation.

Good statistical practice calls for data collection procedures that minimize the risk of unrepresentative sampling, analytical tools appropriate to deal with a given sample, and trained interpretation that recognizes the potential limitations of both data and techniques. Used properly in this fashion, statistical methods serve as an illuminating and valuable interface between the often enormous quantities of data that can inform a particular investigation, and the human decision makers that must somehow make sense of this wealth of information.

II. STATISTICS AND EMPIRICAL ANALYSES CAN BE VALUABLE IN LITIGATION SETTINGS.

Statistical tools are important not only in science and economics generally, but also in litigation. Statistics and other empirical methods can contribute to answering questions as diverse as the following: After accounting for differences in qualifications, were

female employees of a firm discriminated against in promotion and compensation decisions? How much were purchasers of a product overcharged by suppliers who conspired to fix prices? Did a car manufacturer place drivers at risk of injury by installing faulty parts in its vehicles? Were minority borrowers given less favorable loan terms by a lender than white borrowers, after taking into account differences in credit scores? Were consumers misled by an alleged trademark infringement? Did health care providers engage in systematic overbilling? What is the proper measure of lost profits or damages in a given commercial dispute? These questions are among the many that American courts are routinely asked to decide, and as we enter the age of "big data," the value of statistical methods in answering them will only increase.

We believe the importance of statistical analysis – or "learning from data" – is further magnified in class action lawsuits, in which individual claims are aggregated. This is because there is typically more data available in such cases, and thus, more to learn. The law permits the aggregation of claims for reasons of both efficiency and fairness. These reasons are not undermined if statistical tools are used to describe or analyze the totality of the claims in a class action. To the contrary, as more data is available for analysis, as is likely when multiple claims are aggregated, more questions can be answered, *and can be answered better*, through rigorous statistical examination of the data. To restrict the contribution that statistical tools

are permitted to make in these instances is to ignore the vast amounts of useful information often available in class action cases.

In making this argument, we do not advocate "trial by formula" (a label that Petitioner and certain amici employ to describe the use of statistical proof) to replace responsible judicial decision making. This label reflects a profound mischaracterization of the responsible application of statistical methods in litigation. Statistical algorithms cannot make decisions for courts, but statistical evidence can inform them.

Against this backdrop, the central point we wish to make in this amicus brief is that the Court should not cast doubt on statistical and empirical methods as a general matter, whether in class actions or otherwise. Statistical tools are far too valuable, and are used responsibly and reliably in far too many contexts, for this Court to cast doubt on their utility. Indeed, we respectfully submit that the Court should *embrace* the value of statistical analysis of empirical data as a category of proof in complex litigation that, used properly, can shed significant light on disputed issues.

III. WHETHER EVIDENCE IS RELIABLE IS FACT-DEPENDENT.

That is not to say that a *particular* expert study should be accepted uncritically. The reliability of expert evidence is inherently context-dependent, and

there is no question a given study may or may not be appropriate in a particular case. But that inquiry does not turn in any meaningful way on generic labels such as "average" or "statistical" or "extrapolated." Just as no sensible economist would cast categorical doubt on the use of such methods, the Court should exercise the same restraint.

Caution is particularly warranted given that the expert study in *Tyson* – an "average" time study by an industrial engineer – is so far removed from the use of economic and statistical data in many other litigation settings. As economists and social scientists with no expertise in industrial engineering, we take no position on the merit of the Tyson time study. We emphasize, however, that the case presents an inappropriate record on which to make general pronouncements about the reliability of statistical or empirical studies in other class actions.

The case does not involve multiple regression analysis, for example, an accepted tool that uses standard statistical techniques to control for relevant variables (including, for example, certain individual class member characteristics) and to test empirically the extent to which a given regression model reliably describes the relevant population, process or variable of interest. These methods bear little resemblance to anything at issue in *Tyson*.

Petitioner and amici nevertheless conflate these dissimilar methods to advance the sweeping argument that class actions should not be certified using

any type of average or statistical proof. But the Court should not use a particular donning and doffing study to address empirical methods not at issue. Instead, the Court should adhere to the traditional gatekeeping standards of Rule 702 and *Daubert*,[12] which provide an appropriately case-specific framework for evaluating the reliability of a particular expert analysis. *See Kumho Tire Co. v. Carmichael*, 526 U.S. 137, 150 (1999) (*Daubert* "gatekeeping inquiry 'must be tied' to the 'facts' of a particular case . [because] [t]oo much depends on the particular circumstances of the particular case at issue") (quoting *Daubert*, 509 U.S. at 591).

Tyson and various amici nevertheless attempt to re-cast what, fundamentally, should be a fact-bound *Daubert* analysis into a broader question of law on the use of "average" and "statistical" proof in any and all class actions. Tyson's reasons for doing so are obvious – having apparently failed to file a *Daubert* motion to develop these issues in the proper way – but the Court should not allow Tyson to end-run that failure by reaching an unnecessarily broad holding of law that could trigger serious unintended consequences in cases far beyond the wage and hour context. *Cf. Glossip v. Gross*, 135 S. Ct. 2726, 2744-45 (2015) (rejecting petitioners' attempt to re-cast what "is more of a *Daubert* challenge" to contested expert testimony).

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[12] *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579 (1993).

In the end, the Court should be mindful of the longstanding economic and scientific acceptance of "average" and statistical analysis in many different contexts – including class action litigation – in light of which the undersigned respectfully submit that the Court should evaluate the *Tyson* expert issues in a narrow, fact-bound way as opposed to the categorical terms suggested by Petitioner and other amici.

CONCLUSION

For the reasons hereinabove stated, amici respectfully request that in resolving the questions presented in the *Tyson* matter, the Court limit its holding to the narrow facts at issue in that case.

Respectfully submitted,

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Dr. B. Douglas Bernheim is the Edward Ames Edmonds Professor of Economics in the Department of Economics at Stanford University, as well as Department Chair. He received an A.B. in Economics from Harvard University and a Ph.D. from the Massachusetts Institute of Technology. Dr. Bernheim's work has spanned a variety of fields, including public economics, behavioral economics, game theory, contract theory, industrial organization, political economy, and financial economics. He has provided expert testimony in high-profile litigation, mergers, and regulatory matters on such topics as market definition, competitive impact, countervailing efficiencies, monopolization, antitrust liability, causation, and damages. He is the author of more than 125 publications, including 60 peer-reviewed journal articles, four books, and many other professional and academic publications. He holds multiple distinctions, including John Simon Guggenheim Memorial Foundation Fellowship, Center for Advanced Study in the Behavioral Sciences Fellow, American Academy of Arts and Sciences Fellow, and Econometric Society Fellow. He is also listed in the *Global Competition Review*'s International Who's Who of Competition Economists.

Dr. Robin Ann Cantor is a Managing Director at Berkeley Research Group, LLC and has more than 30 years of experience in the areas of applied economics, statistics, risk management, and claims analysis. Before joining BRG, Dr. Cantor led practice groups at national consulting firms, was Program Director for

Decision, Risk, and Management Sciences, a research program of the National Science Foundation; and was a senior researcher at Oak Ridge National Laboratory. Dr. Cantor has a faculty appointment at Johns Hopkins University and has served on scientific advisory committees for the National Academies of Science, the National Science Foundation, the U.S. Environmental Protection Agency, the National Oceanic and Atmospheric Administration, the National Academy of Public Administration, the JHU School of Engineering, and Carnegie Mellon University. She is a past President and Fellow of the International Society for Risk Analysis; a past President of the Board of Directors for MATRIX, The Business Center for Women and Minorities; and is the current President of the Women's Council on Energy and the Environment. Dr. Cantor has published extensively on numerous topics in economics and her publications include peer reviewed articles, book chapters, expert reports, reports for federal sponsors, a book on the foundations of economic exchange, and an edited book on product liability. Dr. Cantor has testified as an expert on economic damages, statistical models and estimation methods, and class certification issues, among other areas.

Dr. David W. DeRamus is a Partner and founding member of Bates White LLC, an economic consulting firm. Dr. DeRamus specializes in the economic analysis of antitrust, transfer pricing, commercial litigation, and energy issues. Over the past 20 years, Dr. DeRamus has testified as an expert witness and

served as a consulting economist in numerous antitrust, regulatory, and other commercial disputes, mostly with respect to damages issues.

Dr. Mark J. Dwyer is an economist specializing in empirical methods applied to antitrust and class actions. Over the past 10 years he has provided testimony to several state and federal courts in these areas. He has worked as a consulting economist in these fields for the past 14 years. Prior to that he was an assistant professor in the UCLA economics department.

Dr. Andrew Gelman is a professor of statistics and political science and director of the Applied Statistics Center at Columbia University. He has received the Outstanding Statistical Application award from the American Statistical Association, the award for best article published in the American Political Science Review, and the Council of Presidents of Statistical Societies award for outstanding contributions by a person under the age of 40. His books include *Bayesian Data Analysis* (with John Carlin, Hal Stern, David Dunson, Aki Vehtari, and Don Rubin), *Teaching Statistics: A Bag of Tricks* (with Deb Nolan), *Data Analysis Using Regression and Multilevel/Hierarchical Models* (with Jennifer Hill), *Red State, Blue State, Rich State, Poor State: Why Americans Vote the Way They Do* (with David Park, Boris Shor, and Jeronimo Cortina), and *A Quantitative Tour of the Social Sciences* (co-edited with Jeronimo Cortina).

Dr. Vivek Ghosal is a Professor in the School of Economics at Georgia Institute of Technology. Professor Ghosal has published two edited books: *The Political Economy of Antitrust* (Elsevier, 2007) and *Reforming Rules and Regulations: Laws, Institutions and Implementation* (MIT Press, 2010), and is a member of the Editorial Boards of the journals *Review of Industrial Organization* and *Business Strategy and the Environment*. He has published in peer-reviewed journals in economics, management, and law & economics, including: *Journal of Industrial Economics*, *International Journal of Industrial Organization*, *Journal of Law and Economics*, *Review of Economics and Statistics*, *Research Policy*, *Small Business Economics*, *Managerial and Decision Economics*, *Business Strategy and the Environment*, *Journal of Competition Law & Economics*, *Review of Industrial Organization*, and *Review of Law & Economics*. Prior to joining Georgia Tech in 2001, Professor Ghosal was an Economist at the Economic Analysis Group of the Antitrust Division, U.S. Department of Justice.

Dr. Michael Harris is President of Harris Economics Group, LLC and has been a consulting economist for the last 28 years. He specializes in applied microeconomics and industrial organization and has served as a testifying economic expert in over seventy engagements before state and federal courts, the Federal Energy Regulatory Commission, numerous state regulatory commissions, the Ontario Energy Board, and the Alberta Energy and Utilities Board.

The matters on which he has provided testimony and consulting include energy market regulation, antitrust issues, class certification, and damages.

Dr. Ken Hendricks is Professor of Economics at the University of Wisconsin-Madison. His primary field of research is industrial organization. He has conducted theoretical and empirical studies on bidding behavior in auctions. His research also includes studies on the demand for music, games of timing, sender-receiver games, and airline networks. He currently holds the Christensen Chair of Economics at the University of Wisconsin-Madison. He is an associate editor of the *American Economic Journal: Microeconomics* and is on the editorial board of the *Journal of Economic Literature*. He is a research associate of the National Bureau of Economic Research and a Fellow of the Econometric Society.

Dr. Jonathan N. Katz is the Kay Sugahara Professor of Social Sciences and Statistics and the Chair of the Division of the Humanities and Social Sciences at the California Institute of Technology. He also is the Director of the Ronald and Maxine Linde Institute of Economic and Management Sciences. His research interests focus on American politics, political methodology (statistics applied to political science), and formal political theory. He is an elected fellow of both the American Academy of Arts and Sciences and the Society for Political Methodology. He has testified numerous times in state and federal court on using statistical analysis.

Dr. Gary King is the Albert J. Weatherhead III University Professor at Harvard University – one of 24 with the title of University Professor, Harvard's most distinguished faculty position. He is based in the Department of Government (in the Faculty of Arts and Sciences) and serves as Director of the Institute for Quantitative Social Science. Dr. King develops and applies empirical methods in many areas of social science research, focusing on innovations that span the range from statistical theory to practical application. Dr. King is an elected Fellow in 8 honorary societies (National Academy of Sciences 2010, National Academy of Social Insurance 2014, American Statistical Association 2009, American Association for the Advancement of Science 2004, American Academy of Arts and Sciences 1998, Society for Political Methodology 2008, American Academy of Political and Social Science 2004, and the Guggenheim Foundation 1994-95) and has won more than 40 "best of" awards for his work. His work on legislative redistricting has been used in most American states by legislators, judges, lawyers, political parties, minority groups, and private citizens, as well as the U.S. Supreme Court. His work on inferring individual behavior from aggregate data has been used in as many states by these groups, and in many other practical contexts. The statistical methods and software he develops are used extensively in academia, government, consulting, and private industry.

Dr. Tilman Klumpp is an Associate Professor of Economics at the University of Alberta, Canada,

specializing in public economics, law and economics, and industrial organization. His articles have been published in numerous academic journals, including the *Journal of Public Economics*, the *Journal of Industrial Economics*, the *American Economic Journal*, the *American Law and Economics Review*, *Economic Theory*, *Managerial and Decision Economics*, and the *Journal of Mathematical Economics*. Previously, Dr. Klumpp taught economics at Indiana University and Emory University.

Dr. Esfandiar (Essie) Maasoumi is the Arts and Sciences Distinguished Professor of Economics at Emory University, Atlanta, GA. He is the author and coauthor of more than 100 articles, reviews, and books, including special issues of the *Journal of Econometrics* and *Econometric Reviews*. He has written theoretical and empirical papers in both economics and econometrics and consults on law and economics issues. Maasoumi received B.Sc. (1972), M.Sc. (1973), and Ph.D. (1977) degrees from the London School of Economics, United Kingdom. Maasoumi is a Fellow of the Royal Statistical Society (FRS), a Fellow of the American Statistical Association, and a Fellow of the *Journal of Econometrics*. He is a member of the Econometric Society, the American Statistical Association, the American Economic Association, and the American Mathematical Society. He is the Editor of *Econometric Reviews* and is on the Board of the *Journal of Economic Studies* and the Advisory Board of the Info-Metrics Institute.

Dr. Jeffrey K. MacKie-Mason is the University Librarian and Chief Digital Scholarship Officer at the University of California, Berkeley. He is an economist who recently completed 29 years at the University of Michigan, where he was the Arthur W. Burks Collegiate Professor of Information and Computer Science, Professor of Economics, and Professor of Public Policy. His research has included the economics of antitrust and industrial organization. He has published over 85 scholarly articles. He founded an antitrust economics consulting firm, Resource Economics in 1989, which since 2000 has done business under the name applEcon LLC. He has testified before numerous federal and state courts, and before the U.S. Department of Justice and the U.S. Federal Trade Commission.

Dr. Ian M. McCarthy is a Ph.D. Economist specializing in the application of microeconomic theory, statistics, and econometrics to the field of health economics. He has published articles in microeconomic theory, econometrics, and health economics, including recent publications in the *Journal of Human Resources* and *Health Economics*. He has also served as a referee for the *Review of Economics and Statistics*, *Empirical Economics*, the *Review of Economics of the Household*, and other academic journals. He is currently an Assistant Professor of Economics at Emory University. Prior to joining Emory University, Dr. McCarthy was the Director of Health Economics for Baylor Scott & White Health and a Director in the

economic consulting practice of FTI Consulting in Dallas, TX.

Dr. Nolan McCarty is the Susan Dod Brown Professor of Politics and Public Affairs and Chair of the Department of Politics at Princeton University. He was formerly the associate dean at the Woodrow Wilson School of Public and International Affairs. His research interests include U.S. politics, democratic political institutions, and political game theory. He is the recipient of the Robert Eckles Swain National Fellowship from the Hoover Institution and the John M. Olin Fellowship in Political Economy. He has co-authored three books: *Political Game Theory* (2006, Cambridge University Press with Adam Meirowitz), *Polarized America: The Dance of Ideology and Unequal Riches* (2006, MIT Press with Keith Poole and Howard Rosenthal) and *Political Bubbles: Financial Crises and the Failure of American Democracy* (with Keith Poole and Howard Rosenthal). In 2010, he was elected a fellow of the American Academy of Arts and Sciences.

Dr. Charles L. Miller Jr. is a Partner at Bates White LLC, an economic consulting firm, and previously was a Partner at Dickstein Shapiro LLP, a law firm. Dr. Miller specializes in antitrust matters and, over the past 20 years, has been retained in numerous antitrust cases as an economic consultant and, previously, as an attorney. He also was a faculty member at the Johns Hopkins University.

Dr. Janet S. Netz is a founding partner of applEcon, LLC, a boutique economics consulting firm specializing in economic analyses of competition in antitrust cases. Prior to her work in antitrust cases, Dr. Netz was a tenured associate professor of economics at Purdue University and a visiting associate professor at the University of Michigan. She has published a number of articles on competition strategies and outcomes in scholarly journals including the *Review of Economics and Statistics*, the *Journal of Economics and Management Strategy*, and the *Antitrust Law Journal*. Dr. Netz is especially known for her work on quantifying the harm to indirect purchasers in markets subject to monopolization and cartelization.

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